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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BP107666	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI2003/000718	International filing date (day/month/year) 02-10-2003	Priority date (day/month/year) 02-10-2002
International Patent Classification (IPC) or national classification and IPC H04Q 7/38, H04L 12/56, H04Q 7/22		
Applicant Nokia Corporation et al.		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☒ (sent to the applicant and to the International Bureau) a total of 11 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input checked="" type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand 28-04-2004	Date of completion of this report 09-12-2004
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Roger Bou Faisal /LR Telephone No. +46 8 782 25 00

Form PCT/IPEA/409 (cover sheet) (January 2004)

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI2003/000718

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-4, 8-15 as originally filed/furnished
- pages* 5, 6, 7, 7a received by this Authority on 25-08-2004
- pages* _____ received by this Authority on _____
- ☒ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* 16-22 received by this Authority on 25-08-2004
- pages* _____ received by this Authority on _____
- ☒ the drawings:
- pages 1-8 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-54</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-54</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-54</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The invention concerns a method for indicating one or more requirements for point-to-multipoint MBMS (Multimedia Broadcast/Multicast Service) service reception in a wireless system. The object of the invention is to reduce the power consumption and avoid most error cases, in a MBMS wireless system, by communicating service requirements and capability notifications between the wireless terminals and the wireless system.

Reference is made to the following documents:

D1: WO 0126409, A1

D2: WO 9826625, A2

D3: US 2002071480, A1

D4: US 2001010685, A1

D5: 3GPP TS 22.146 V6.0.0 (2002-06), Technical specification, 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Multimedia Broadcast/Multicast Service; Stage 1 (release 6).

D6: WO 0152583, A1

Document D1 is considered to represent the closest prior art. D1 relates to a method of broadcasting service capabilities in a cellular telecommunications network. The network broadcasts handover requirements messages to the user equipment with a bitmap indicating the radio access technology types and generations for which the base station requires the user equipment unit to make handover measurements, power measurements and reports. Based on the capability message the user equipment unit determines which of the services available in the cell the mobile equipment unit supports and prefers to use (Abstract; page 9, line 7-page 14, line 27; and claims 1-17).

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

D1 relates generally to broadcasting of service capabilities in a cellular network. The capability message just informs the terminals about the services (in this case by "services" basically referring to plain network parameters, that is, possibly varying and diverse capabilities of the base station/network itself) supported by the system within that particular cell in order to let the mobile terminal(s) properly register with the network (page 14, rows 3, 19) by utilising a suitable technique, if any, during the activation phase of the terminal(s) (page 12, row 31).

Therefore, the services as such are not unequivocally defined or special characteristic thereof addressed in relation to the mobile terminal's capabilities.

In the present invention the terminals/network shall determine based on the received, unambiguous information whether they/the terminals are capable or incapable to receive related service data to avoid unnecessary transmission/reception attempts.

Thus the invention according to amended claims 1-54 is novel, is considered to involve an inventive step. It is also considered to be industrial applicable.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. VI Certain documents cited

1. Certain published documents (Rule 70.10)

Application No. Patent No.	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
US 2003207696 A1, E	06.11.03	06.05.2002	06.05.2002

2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure	Date of non-written disclosure (day/month/year)	Date of written disclosure referring to non-written disclosure (day/month/year)

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terminal is capable of receiving data on two time slots 302. If, for example, in GERAN the media stream is sent on three adjacent time slots per carrier 304, two time slot capable terminals just cannot receive the service 306. Also, if higher data rate is to be provided by using 8 PSK modulation, only the terminals that support

5 EDGE can receive the service. As a consequence, there exists a great demand for defining and notifying about what kind of requirements the terminals must meet in order to be able to receive a particular MBMS service. The same situation applies to UTRAN with terminals providing varying support for bit-rate adaptation and other properties.

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An object of the present invention is to provide a feasible and reliable technique for indicating requirements for broadcast and multicast service reception. The object is achieved with a method and a device which either explicitly or implicitly provide that information to a receiving end a priori, before actual attempts by the receiving

15 end to receive overly demanding or otherwise incompatible transmission. Thereby, most error cases can be avoided and average power consumption reduced, as the terminal does not need to monitor the broadcast blocks it cannot receive.

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A method according to the invention for indicating one or more requirements for point-to-multipoint MBMS service reception in a wireless system is characterized in that in that said method comprises the step of transmitting a broadcast or multicast message indicating said requirements over the air interface to at least one terminal within the service range in order to allow the terminal to determine whether it is capable of receiving the service or not, said requirements being indicated in relation to at least one of the following: time slot configuration, modulation type, bit rate,

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25 capability class.

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In another aspect of the invention, a method for indicating requirements for point-to-multipoint service reception in a wireless system to be performed by a terminal operable in said system, is characterized in that said method comprises the step informing terminal's capabilities to said system in order to enable the system to deduce on the basis of informed data whether the terminal is capable of receiving the service or not.

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In a further aspect of the invention, a terminal operable in a wireless system, comprising processing means and memory means for processing and storing instructions and data, is characterized in that said terminal is arranged to receive a

35 message indicating requirements for point-to-multipoint service reception and

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arranged to determine on the basis of said requirements whether it is capable of receiving the service or not.

5 In a further aspect of the invention, a terminal operable in a wireless system, comprising processing means and memory means for processing and storing instructions and data, is characterized in that it is arranged to inform its capabilities to said system for the examination of fulfilment of point-to-multipoint service reception requirements.

10 In a further aspect of the invention, a network element operable in a wireless system, comprising processing means and memory means for processing and storing instructions and data, is characterized in that it is arranged to send a message indicating requirements for point-to-multipoint service reception to be delivered to at least one wireless terminal within the service range in order to allow said wireless terminal to determine whether it is capable of receiving the service or not.

15 In a further aspect of the invention, a network element operable in a wireless system, comprising processing means and memory means for processing and storing instructions and data, is characterized in that it is arranged to receive a notification from a terminal and deduce on the basis of said notification whether the terminal is capable of receiving a point-to-multipoint service or not.

20 A system according to the invention comprises a network element and at least one wireless terminal operable in said system, and the system is characterized in that said network element comprises means for sending a message indicating requirements for point-to-multipoint service reception to be delivered to at least said wireless terminal within the service range and said terminal comprises means for receiving said broadcast message indicating requirements for point-to-multipoint service reception and means for determining on the basis of said indication whether it is capable of receiving the service or not.

30 In one embodiment of the invention a system already comprising CBS (Cell Broadcast Service) is supposed to support more versatile MBMS services as well and notify terminals in-range about the requirements for service reception in conjunction with sending a CBS schedule message disclosing data about MBMS services instead. In practise, the requirements are notified by informing the terminals about an applicable MBMS capability class. Three different capability classes define the minimum capabilities required for receiving available services.

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In another embodiment of the invention a mobile terminal capable of receiving point-to-multipoint services informs the system it is connected to about its capabilities such as a maximum number of concurrently receivable downlink time slots for joining a certain MBMS multicast service. The system checks if necessary
5 minimum requirements for the joining/service reception are met and if that is the case, accepts the joining request and if not, rejects it.

The accompanying dependent claims describe some embodiments of the invention.

10 In the following, the invention is described in more detail by reference to the attached drawings, wherein

Fig. 1 is a block diagram of a MBMS capable system as referred to in the description of the background of the invention.

15 Fig. 2 depicts provision of MBMS broadcast and multicast services as presented in the reference [2].

Fig. 3 depicts a scenario, wherein a mobile terminal supports monitoring of two time slots per frame and thus is not capable of receiving a service requiring three time slots.

20 Fig. 4 is a signalling chart disclosing one option for MBMS Broadcast service activation and requirements indication as proposed in a first embodiment of the invention.

Fig. 5 is an example of an indication request message disclosed in figure 4

25 Fig. 6 illustrates one possible MBMS capability class division according to the first embodiment of the invention.

Fig. 7 illustrates a CBS schedule message in accordance with the first embodiment of the invention.

Fig. 8A is a flow diagram disclosing the first embodiment of the invention

Fig. 8B is a flow diagram disclosing a second embodiment of the invention

30 Fig. 9A is a block diagram of a wireless terminal, substantially a cellular phone, capable of sending and receiving broadcast/multicast data according to the invention.

Fig. 9B is a block diagram of a network element capable of sending and receiving broadcast/multicast data according to the invention.

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Claims

1. A method for indicating one or more requirements for point-to-multipoint MBMS (Multimedia Broadcast/Multicast Service) service reception in a wireless system, **characterized** in that said method comprises the step of
 - 5 -transmitting a broadcast or multicast message indicating said requirements over the air interface to at least one terminal within the service range in order to allow the terminal to determine whether it is capable of receiving the service or not (822), said requirements being indicated in relation to at least one of the following: time slot configuration, modulation type, bit rate,
10 capability class.
2. A method of claim 1, **characterized** in that a decision of whether to receive the service or not is made in the terminal on the basis of said indication.
3. A method of claim 1-2, **characterized** in that it further comprises a step wherein said requirements for receiving the service are defined (820).
- 15 4. A method of claim 1-2, **characterized** in that it further comprises a step wherein the service-related data is transmitted in conformity with indicated requirements (824).
5. A method of claim 1-2, **characterized** in that said requirements are indicated in said message implicitly with an identifier associated to a certain set of
20 requirements.
6. A method of claim 1-2, **characterized** in that said requirements are indicated in said message explicitly with parameters.
7. A method of claim 1-6, **characterized** in that said system is substantially GSM (Global System for Mobile communication)/GPRS (General Packet Radio
25 Service) or UMTS (Universal Mobile Telecommunications System) system.
8. A method of claim 1-7, **characterized** in that said message is transmitted to the terminals over radio access network.
9. A method of claim 8, **characterized** in that said radio access network is GERAN (GSM/EDGE Radio Access Network) or UTRAN (UMTS Terrestrial
30 Radio Access Network).

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10. A method of claim 1-8, **characterized** in that said message is originated by a network element.
11. A method of claim 1-10, **characterized** in that said message is sent by the CBC (Cell Broadcast Centre) or RNC/BSC (Radio Network Controller/BaseStation Controller).
12. A method of claim 1-8, **characterized** in that said message is substantially a schedule message.
13. A method of claim 12, **characterized** in that said schedule message is CBS (Cell Broadcast Service) service specific.
- 10 14. A method of claim 1-6, **characterized** in that said message is a discrete indication message.
- 15 15. A method for indicating requirements for point-to-multipoint service reception in a wireless system to be performed by a terminal operable in said system, **characterized** in that said method comprises the step of
- 15 -informing terminal's capabilities to said system in order to enable the system to deduce on the basis of the informed data whether the terminal is capable of receiving the service or not (804).
16. A method of claim 15, **characterized** in that it further comprises a step (806) wherein the system either accepts or rejects the terminal's join request based on said deduction.
- 20 17. A method of claim 15, **characterized** in that said system is substantially GSM (Global System for Mobile communication)/GPRS (General Packet Radio Service) or UMTS (Universal Mobile Telecommunications System) system.
18. A method of claim 15, **characterized** in that said informing is performed over
- 25 a radio access network that is substantially GERAN (GSM/EDGE Radio Access Network) or UTRAN (UMTS Terrestrial Radio Access Network).
19. A method of claim 15, **characterized** in that said informed data indicates at least one of the following features supported by said terminal: time slot configuration, modulation type, bit rate, capability class.

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20. A method of claim 15-16, **characterized** in that it further comprises a step wherein the service-related data is transmitted in conformity with indicated requirements (810).
21. A method of claim 16-20, **characterized** in that said point-to-multipoint service is MBMS (Multimedia Broadcast/Multicast Service).
22. A method of claim 16-20, **characterized** in that said point-to-multipoint service is substantially a multicast service.
23. A method of claim 16-20, **characterized** in that the air interface in said system is substantially in accordance with DVB (Digital Video Broadcasting) or WLAN (Wireless Local Area Network) specifications.
24. A terminal (900) operable (904, 906, 914, 915) in a wireless system, comprising processing means (908) and memory means (910) for processing and storing instructions and data, **characterized** in that said terminal is arranged to receive a message indicating requirements for point-to-multipoint service reception and further arranged to determine on the basis of said requirements whether it is capable of receiving the service or not.
25. A terminal of claim 24, **characterized** in that it is arranged to specify said requirements indicated in said message by associating at least one identifier included in said message to a certain set of requirements.
26. A terminal of claim 24, **characterized** in that it is arranged to extract said requirements directly from said message wherein said requirements are described explicitly.
27. A terminal of claim 24, **characterized** in that said message to be received is a point-to-multipoint message.
28. A terminal of claim 24, **characterized** in that it is substantially a GSM (Global System for Mobile communication) or UMTS (Universal Mobile Telecommunications System) terminal.
29. A terminal of claim 24, **characterized** in that it is arranged to extract said indications of service requirements from a schedule message.

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30. A terminal of claim 24, **characterized** in that it is arranged to extract at least one of the following parameters defining said requirements from said message: time slot configuration, modulation type, bit rate, capability class.
- 5 31. A terminal of claim 24, **characterized** in that it is arranged to receive said message from the system over the air interface congruent with DVB (Digital Video Broadcasting) or WLAN (Wireless Local Area Network) specifications.
- 10 32. A terminal (900) operable (904, 906, 914, 915) in a wireless system, comprising processing means (908) and memory means (910) for processing and storing instructions and data, **characterized** in that it is arranged to inform its capabilities to said system for the examination of fulfilment of point-to-multipoint service reception requirements.
33. A terminal of claim 32, **characterized** in that said informing is to be included in a join request for a multicast service.
- 15 34. A terminal of claim 32, **characterized** in that it is substantially a GSM (Global System for Mobile communication) or UMTS (Universal Mobile Telecommunications System) terminal.
- 20 35. A network element (918) operable (920) in a wireless system, comprising processing means (923) and memory means (921) for processing and storing instructions and data, **characterized** in that it is arranged to send a message indicating requirements for point-to-multipoint service reception to be delivered to at least one wireless terminal within the service range in order to allow said wireless terminal to determine whether it is capable of receiving the service or not.
36. A network element of claim 35, **characterized** in that said message to be sent is a point-to-multipoint message.
- 25 37. A network element of claim 35, **characterized** in that it is arranged to define said requirements for receiving said point-to-multipoint service.
38. A network element of claim 35, **characterized** in that it is arranged to receive said requirements for point-to-multipoint service reception prior indicating them.

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39. A network element of claim 35, **characterized** in that it is arranged to insert said indication of requirements into said message by at least one identifier associated to a certain set of requirements.
- 5 40. A network element of claim 35, **characterized** in that it is arranged to insert said indication of requirements into said message explicitly by at least one parameter.
41. A network element of claim 35, **characterized** in that said it is arranged to operate in a GSM (Global System for Mobile communication)/GPRS (General Packet Radio Service) or UMTS (Universal Mobile Telecommunications System)
10 system.
42. A network element of claim 35, **characterized** in that it is arranged to transmit said message to be delivered over radio access network.
43. A network element of claim 42, **characterized** in that said radio access network is GERAN (GSM/EDGE Radio Access Network) or UTRAN (UMTS
15 Terrestrial Radio Access Network).
44. A network element of claim 35, **characterized** in that it is substantially the CBC (Cell Broadcast Centre).
45. A network element of claim 35, **characterized** in that said message to be sent is substantially a schedule message.
- 20 46. A network element of claim 35, **characterized** in that said message to be sent is a discrete indication message.
47. A network element of claim 35, **characterized** in that said message to be sent includes at least one of the following requirements: time slot configuration, modulation type, bit rate, capability class.
- 25 48. A network element of claim 35, **characterized** in that said point-to-multipoint service is MBMS (Multimedia Broadcast/Multicast Service).
49. A network element of claim 35, **characterized** in that said point-to-multipoint service is substantially a broadcast or multicast service.

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50. A network element of claim 35, **characterized** in that the air interface in said system is substantially in accordance with DVB (Digital Video Broadcasting) or WLAN (Wireless Local Area Network) specifications.
51. A network element (918) operable (920) in a wireless system, comprising
5 processing means (923) and memory means (921) for processing and storing instructions and data, **characterized** in that it is arranged to receive a notification from a terminal and deduce on the basis of said notification whether the terminal is capable of receiving a point-to-multipoint service or not.
52. A network element of claim 51, **characterized** in that it is arranged to accept
10 or reject the terminal's join request based on said decision.
53. A network element of claim 51, **characterized** in that said point-to-multipoint service is MBMS (Multimedia Broadcast/Multicast Service).
54. A network element of claim 51, **characterized** in that said point-to-multipoint service is substantially a multicast service.
- 15 55. A network element of claim 51, **characterized** in that the air interface in said system is substantially in accordance with DVB (Digital Video Broadcasting) or WLAN (Wireless Local Area Network) specifications.
56. A system comprising a network element (918) and at least one wireless terminal (900) operable in said system, **characterized** in that said network element
20 (918) comprises means (920) for sending a message indicating requirements for point-to-multipoint service reception to be delivered to at least said wireless terminal (900) within the service range and said terminal (900) comprises means (906, 914, 915, 910) for receiving said broadcast message indicating requirements for point-to-multipoint service reception and means (908) for determining on the
25 basis of said requirements whether it is capable of receiving the service or not.
57. A system of claim 56, **characterized** in that said message to be sent is a point-to-multipoint message.
58. A system of claim 56, **characterized** in that said network element (918) further comprises means (923) for defining said requirements for point-to-
30 multipoint service reception.

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59. A system of claim 56, **characterized** in that said network element (918) further comprises means (920) for receiving said requirements for point-to-multipoint service reception prior sending said message indicating said requirements.